CLAIMS

What is claimed is:

1. A method for manufacturing an electroluminescent lamp and membrane switch assembly, said method comprising the following steps of:

forming capacitive electrodes from a metal foil by embossing said metal foil onto a light transmissive insulating flexible plastic film;

forming electrical distribution pathways connected to said capacitive electrodes from a metal foil by embossing said metal foil onto said light transmissive insulating flexible plastic film;

forming electrical terminations that connect to said electrical distribution pathways from a metal foil by embossing said metal foil onto said light transmissive insulating flexible plastic film;

forming a pair of switch contact electrodes from a metal foil by embossing said metal foil onto said light transmissive insulating flexible plastic film;

forming electrical distribution pathways connected to said

pair of switch contact electrodes from a metal foil by embossing said metal foil onto said light transmissive insulating flexible plastic film;

forming electrical terminations that connect to said electrical distribution pathways from a metal foil by embossing said metal foil onto said light transmissive insulating flexible plastic film;

forming a switch contact shunt electrode from a metal foil by embossing said metal foil onto said light transmissive insulating flexible plastic film;

applying said light transmissive insulating flexible plastic film to an optically registered indexing system, said optically registered indexing system to precisely position said light transmissive insulating plastic film for further electroluminescent lighted membrane switch construction processing;

applying a light transmissive electrically conductive layer to said light transmissive insulating plastic film, said light transmissive electrically conductive layer contacting one said capacitive electrode thereby creating a light transmissive first capacitive plate;

applying a layer of electroluminescent phosphor to said light

transmissive electrically conductive layer, said electroluminescent phosphor layer for precisely defining an area of illumination;

applying a layer of capacitive dielectric to said metal foil capacitive electrode, said capacitive dielectric for electrically isolating said electroluminescent phosphor layer;

applying a conductive layer to said capacitive dielectric layer, said conductive layer contacting said opposite capacitive electrode thereby creating a second capacitive plate;

applying an insulating layer to cover said second capacitive plate, said insulating layer extending to cover said electrical distribution pathways;

applying an insulating spacer surrounding said switch contact shunt electrode, said insulating spacer substantially forming a frame element that is offset from the perimeter of switch contact shunt electrode;

applying a second insulating layer onto said first insulating layer substantially centered over said second capacitive plate and of a shape and size to approximate the shape and size of said switch contact shunt electrode, said second insulating layer substantially forming a convex outer surface;

die cutting said light transmissive insulating flexible plastic film in a pattern comprising a three part, two hinged foldable electroluminescent illuminated membrane switch subassembly having a tab portion extending therefrom, said tab portion supporting said electrical terminations connecting to said electrical distribution pathways, thus creating an electroluminescent illuminated membrane switch subassembly;

folding a first portion from said electroluminescent illuminated membrane switch subassembly, said first portion folded at the location of one of two said hinges and substantially positioning said switch contact shunt electrode opposite switch contact electrodes; and

folding a second portion from said electroluminescent illuminated membrane switch subassembly, said second portion folded at the location of the remaining said hinge and substantially positioning said second insulating layer opposite said switch contact shunt electrode.

2. The method of claim 1 wherein said metal foil is die cut to form said capacitive electrodes.

3. The method of claim 1 wherein said metal foil is chemically etched to form said capacitive electrodes.

4. The method of claim 1 wherein said metal foil is laser cut to form said capacitive electrodes.

5. The method of claim 1 wherein said capacitive electrodes is a layer of electrically conductive ink.

6. The method of claim 1 wherein said capacitive electrodes is a layer of deposited metal.

7. The method of claim 1 wherein said metal foil is die cut to form said electrical distribution pathways.

8. The method of claim 1 wherein said metal foil is chemically etched to form said electrical distribution pathways.

9. The method of claim 1 wherein said metal foil is laser cut to form said electrical distribution pathways.

10. The method of claim 1 wherein said electrical distribution pathways is a layer of electrically conductive ink.

11. The method of claim 1 wherein said electrical distribution pathways is a layer of deposited metal.

12. The method of claim 1 wherein said metal foil is die cut to form said electrical terminations.

13. The method of claim 1 wherein said metal foil is chemically etched to form said electrical terminations.

14. The method of claim 1 wherein said metal foil is laser cut to form said electrical terminations.

15. The method of claim 1 wherein said electrical terminations is a layer of electrically conductive ink.

16. The method of claim 1 wherein said electrical terminations is a layer of deposited metal.

17. The method of claim 1 wherein said metal foil is die cut to form said pair of switch contact electrodes.

18. The method of claim 1 wherein said metal foil is chemically etched to form said pair of switch contact electrodes.

19. The method of claim 1 wherein said pair of switch contact electrodes is a layer of electrically conductive ink.

20. The method of claim 1 wherein said metal foil is laser cut to form said pair of switch contact electrodes.

21. The method of claim 1 wherein said metal foil is die cut to form said switch contact shunt electrode.

22. The method of claim 1 wherein said metal foil is chemically etched to form said switch contact shunt electrode.

23. The method of claim 1 wherein said switch contact shunt electrode is a layer of electrically conductive ink.

24. The method of claim 1 wherein said metal foil is laser cut to form said switch contact shunt electrode.

25. The method of claim 1 wherein said switch contact shunt electrode is embossed to form a substantially convex snap dome contact.

26. The method of claim 1 wherein said light transmissive first capacitive plate is a layer of conductive ink.

27. The method of claim 1 wherein said light transmissive first capacitive electrode layer is a conductive metal oxide coated plastic film.

28. The method of claim 1 wherein said light transmissive first capacitive electrode layer is a conductive ink containing metal oxide.

29. The method of claim 1 wherein said light transmissive first capacitive electrode is a sputter coated layer containing

metal oxide.

30. The method of claim 1 wherein said light transmissive first capacitive electrode is a plasma spray coated metal oxide.

31. The method of claim 1 wherein said light transmissive first capacitive electrode is a conductive organic polymer comprised of PEDOT (Poly-3,4-Ethyelenedioxithiophene).

32. The method of claim 1 wherein said electroluminescent phosphor layer is an electroluminescent phosphor particle imbued plastic film.

33. The method of claim 1 wherein said electroluminescent phosphor layer is an electroluminescent phosphor particle imbued ink.

34. The method of claim 1 wherein said electroluminescent phosphor layer is applied via plasma spray.

35. The method of claim 1 wherein said capacitive dielectric layer is a plastic film.

36. The method of claim 1 wherein said capacitive dielectric layer is an ink.

37. The method of claim 1 wherein said capacitive dielectric layer is applied via plasma spray.

38. The method of claim 1 wherein said second capacitive plate is an ink.

39. The method of claim 1 wherein said second capacitive plate is a metal foil.

40. The method of claim 1 wherein said second capacitive plate is a plated metal.

41. The method of claim 1 wherein said second capacitive plate is metal applied via plasma spray.

42. The method of claim 1 wherein said second capacitive plate is a plated metal plastic film.

43. The method of claim 1 wherein said second capacitive plate is a conductive organic polymer comprised of PEDOT (Poly-3,4-Ethyelenedioxithiophene).

44. The method of claim 1 wherein said insulating spacer surrounding said switch contact shunt electrode is printable elastomeric ink.

45. The method of claim 1 wherein said insulating spacer

surrounding said switch contact shunt electrode is an adhesive.

46. The method of claim 1 wherein said insulating spacer surrounding said switch contact shunt electrode is an adhesively mounted plastic form.

47. The method of claim 1 wherein said insulating spacer surrounding said switch contact shunt electrode is an embossed serpentine spring member.

48. The method of claim 1 wherein said second insulating layer is printable elastomeric ink.

49. The method of claim 1 wherein said second insulating layer is an adhesive.

50. The method of claim 1 wherein said second insulating layer is an adhesively mounted plastic form.

51. A method for manufacturing an electroluminescent lamp and membrane switch assembly, said method comprising the following steps of:

forming rear capacitive plate electrodes from a metal foil by embossing said metal foil onto a first surface of an insulating flexible plastic film;

forming front capacitive electrodes from a metal foil by embossing said metal foil onto said first surface of said insulating flexible plastic film;

forming electrical distribution pathways connected to said capacitive electrodes from a metal foil by embossing said metal foil onto said first surface of said insulating flexible plastic film;

forming electrical terminations that connect to said electrical distribution pathways from a metal foil by embossing said metal foil onto said first surface of said insulating flexible plastic film;

forming a pair of switch contact electrodes from a metal foil by embossing metal foil onto the second surface of said insulating flexible plastic film;

forming electrical distribution pathways connected to said pair of switch contact electrodes from a metal foil by embossing said metal foil onto said second surface of said insulating flexible plastic film;

forming electrical terminations that connect to said electrical distribution pathways from a metal foil by embossing said metal foil onto said second surface of said insulating

flexible plastic film;

forming a switch contact shunt electrode from a metal foil by embossing said metal foil onto said second surface of said insulating flexible plastic film;

applying said insulating flexible plastic film to an optically registered indexing system, said optically registered indexing system to precisely position said insulating plastic film for further electroluminescent lighted membrane switch construction processing;

applying a layer of capacitive dielectric to said metal foil rear capacitive plate electrodes, said capacitive dielectric for electrically isolating said rear capacitive plate electrodes;

applying a layer of electroluminescent phosphor to said capacitive dielectric layer, said electroluminescent phosphor layer for precisely defining an area of illumination;

applying an electrically conductive layer to said electroluminescent phosphor layer, said electrically conductive layer contacting said front capacitive electrodes thereby creating a light transmissive second capacitive plate;

applying an insulating layer to cover said second capacitive

plate, said insulating layer extending to cover said electrical distribution pathways;

die cutting said insulating flexible plastic film in a pattern comprising a three part, two hinged foldable electroluminescent illuminated membrane switch subassembly having a tab portion extending therefrom, said tab portion supporting said electrical terminations connecting to said electrical distribution pathways, thus creating an electroluminescent illuminated membrane switch subassembly;

embossing said insulating flexible plastic film in a pattern comprising a serpentine spring member substantially forming a surrounding frame element that is offset from the perimeter of said switch contact shunt electrode and permanently deforming said switch contact shunt and said insulating flexible plastic film to form a switch actuator surface bordered by said frame element;

folding a first portion from said electroluminescent illuminated membrane switch subassembly, said first portion folded at the location of one of two said hinges and substantially positioning said switch contact shunt electrode opposite said switch contact electrodes; and

folding a second portion from said electroluminescent illuminate membrane switch subassembly, said second portion folded

at the location of the remaining said hinge, thus overlapping said second portion above said first portion and substantially positioning said rear capacitive plate electrode opposite said switch contact shunt electrode.

52. The method of claim 51 wherein said metal foil is die cut to form said rear capacitive plate electrodes.

53. The method of claim 51 wherein said metal foil is chemically etched to form said rear capacitive plate electrodes.

54. The method of claim 51 wherein said metal foil is laser cut to form said rear capacitive plate electrodes.

55. The method of claim 51 wherein said rear capacitive plate electrodes is a layer of electrically conductive ink.

56. The method of claim 51 wherein said rear capacitive plate electrodes is a layer of deposited metal.

57. The method of claim 51 wherein said metal foil is die cut to form said front capacitive electrodes.

58. The method of claim 51 wherein said metal foil is chemically etched to form said front capacitive electrodes.

59. The method of claim 51 wherein said metal foil is laser cut to form said front capacitive electrodes.

60. The method of claim 51 wherein said front capacitive electrodes is a layer of electrically conductive ink.

61. The method of claim 51 wherein said front capacitive electrodes is a layer of deposited metal.

62. The method of claim 51 wherein said metal foil is die cut to form said electrical distribution pathways.

63. The method of claim 51 wherein said metal foil is chemically etched to form said electrical distribution pathways.

64. The method of claim 51 wherein said metal foil is laser cut to form said electrical distribution pathways.

65. The method of claim 51 wherein said electrical distribution pathways is a layer of electrically conductive ink.

66. The method of claim 51 wherein said electrical distribution pathways is a layer of deposited metal.

67. The method of claim 51 wherein said metal foil is die cut to form said electrical terminations.

68. The method of claim 51 wherein said metal foil is chemically etched to form said electrical terminations.

69. The method of claim 51 wherein said metal foil is laser cut to form said electrical terminations.

70. The method of claim 51 wherein said electrical terminations is a layer of electrically conductive ink.

71. The method of claim 51 wherein said electrical terminations is a layer of deposited metal.

72. The method of claim 51 wherein said metal foil is die cut to form said pair of switch contact electrodes.

73. The method of claim 51 wherein said metal foil is chemically etched to form said pair of switch contact electrodes.

74. The method of claim 51 wherein said pair of switch contact electrodes is a layer of electrically conductive ink.

75. The method of claim 51 wherein said metal foil is laser cut to form said pair of switch contact electrodes.

76. The method of claim 51 wherein said metal foil is die cut to form said switch contact shunt electrode.

77. The method of claim 51 wherein said metal foil is chemically etched to form said switch contact shunt electrode.

78. The method of claim 51 wherein said switch contact shunt electrode is a layer of electrically conductive ink.

79. The method of claim 51 wherein said metal foil is laser cut to form said switch contact shunt electrode.

80. The method of claim 51 wherein said switch contact shunt electrode is embossed to form a substantially convex snap dome contact.

81. The method of claim 51 wherein said switch contact shunt located on said second surface of said insulating flexible plastic film is substantially positioned opposite of said rear capacitive plate located on said first surface of said insulating flexible plastic film.

82. The method of claim 51 wherein said first folded portion of said insulating flexible plastic film is embossed to form a serpentine spring member surrounding a die cut aperture opening substantially shaped and sized to allow passage of said switch shunt electrode therethrough, and said aperture opening substantially oppositely positioned above said switch contacts.

83. The method of claim 51 wherein said light transmissive front capacitive plate is a layer of conductive ink.

84. The method of claim 51 wherein said light transmissive front capacitive plate is a conductive metal oxide coated plastic film.

85. The method of claim 51 wherein said light transmissive front capacitive plate is a conductive ink containing metal oxide.

86. The method of claim 51 wherein said light transmissive front capacitive plate is a sputter coated layer containing metal oxide.

87. The method of claim 51 wherein said light transmissive front capacitive plate is a plasma spray coated metal oxide.

88. The method of claim 51 wherein said light transmissive front capacitive plate is a conductive organic polymer comprised of PEDOT (Poly-3,4-Ethyelenedioxithiophene).

89. The method of claim 51 wherein said electroluminescent phosphor layer is an electroluminescent phosphor particle imbued plastic film.

90. The method of claim 51 wherein said electroluminescent

phosphor layer is an electroluminescent phosphor particle imbued ink.

91. The method of claim 51 wherein said electroluminescent phosphor layer is applied via plasma spray.

92. The method of claim 51 wherein said capacitive dielectric layer is a plastic film.

93. The method of claim 51 wherein said capacitive dielectric layer is ink.

94. The method of claim 51 wherein said capacitive dielectric layer is applied via plasma spray.